Detector Operations

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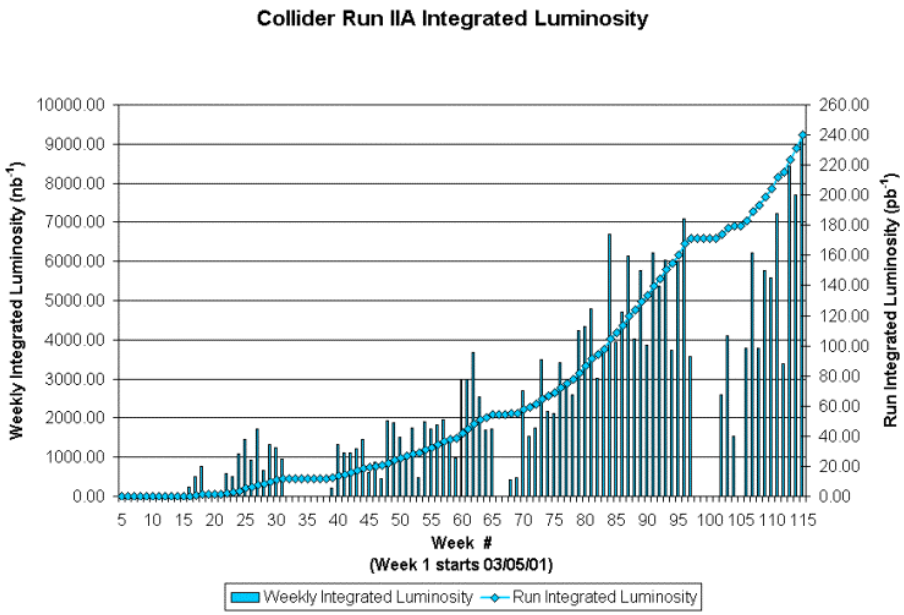
MAY 22, 2003

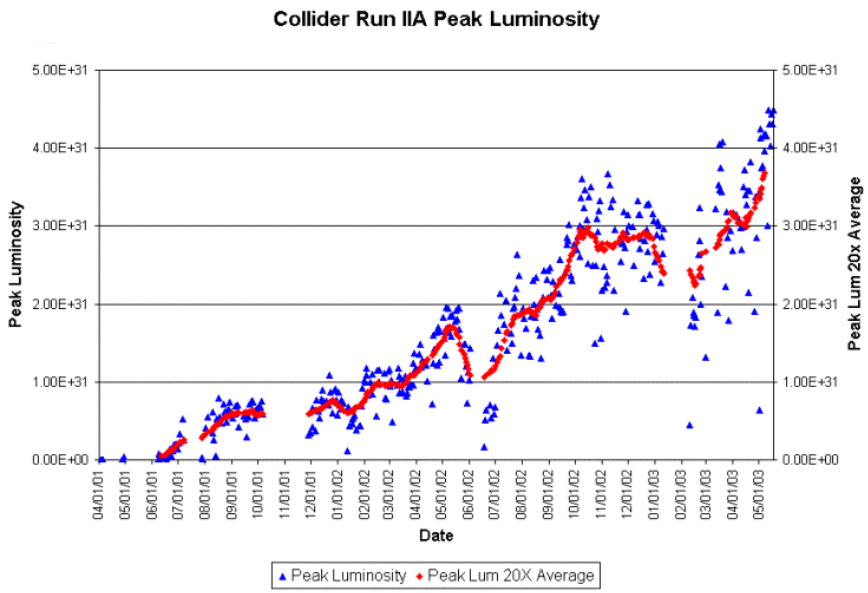
CDF Collaboration Meeting

Outline

- Recent Accelerator Performance & Shutdown plans.
- CDF Data taking Status
- Summary

Accelerator Performance

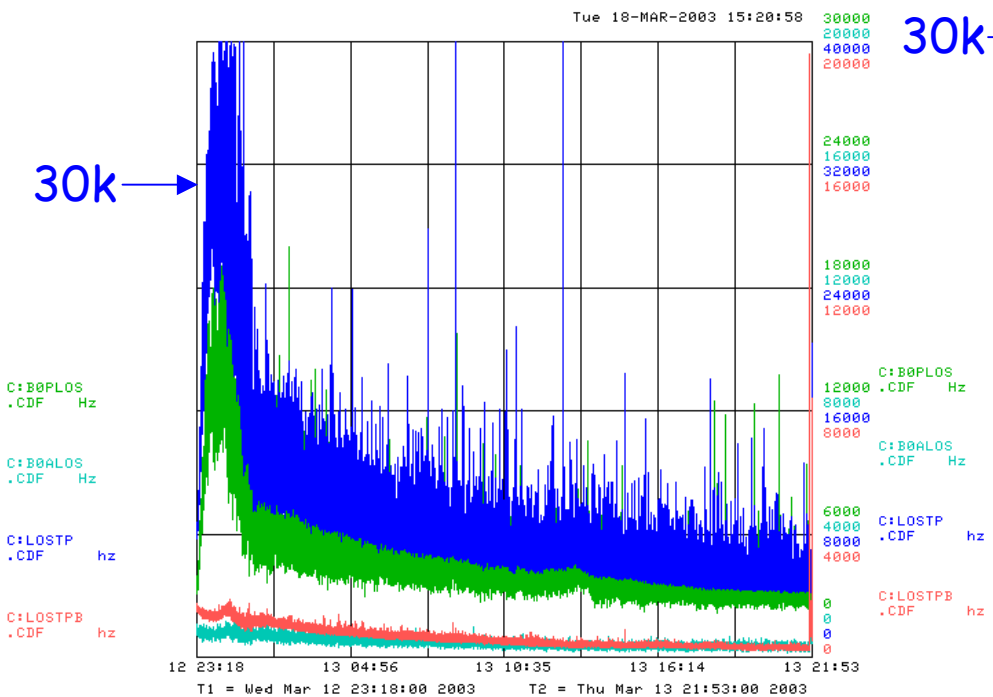




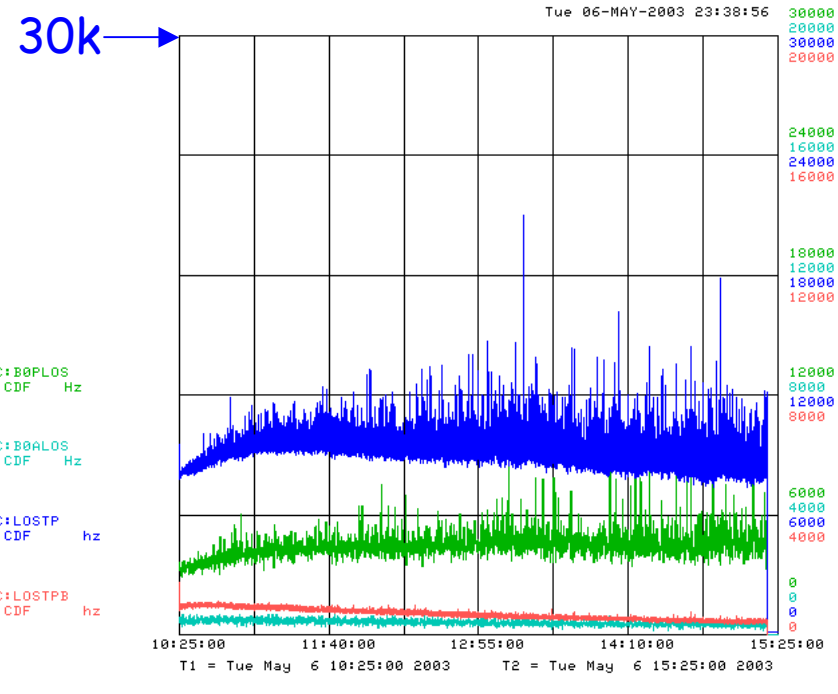
- Braking several records very recently
  - One week integ. Lum Delivered: 9159 nb-1 (May 12-18, 2003)
  - New stacking record of 13.51mA in one hour
  - a new Inst. luminosity record of 44.895E30
  - MI sending 5.45E12 protons to pbar target.

Accelerator (Cont.)

- Losses more manageable (silicon integration – smoother)



March 13, 2003, store#2312

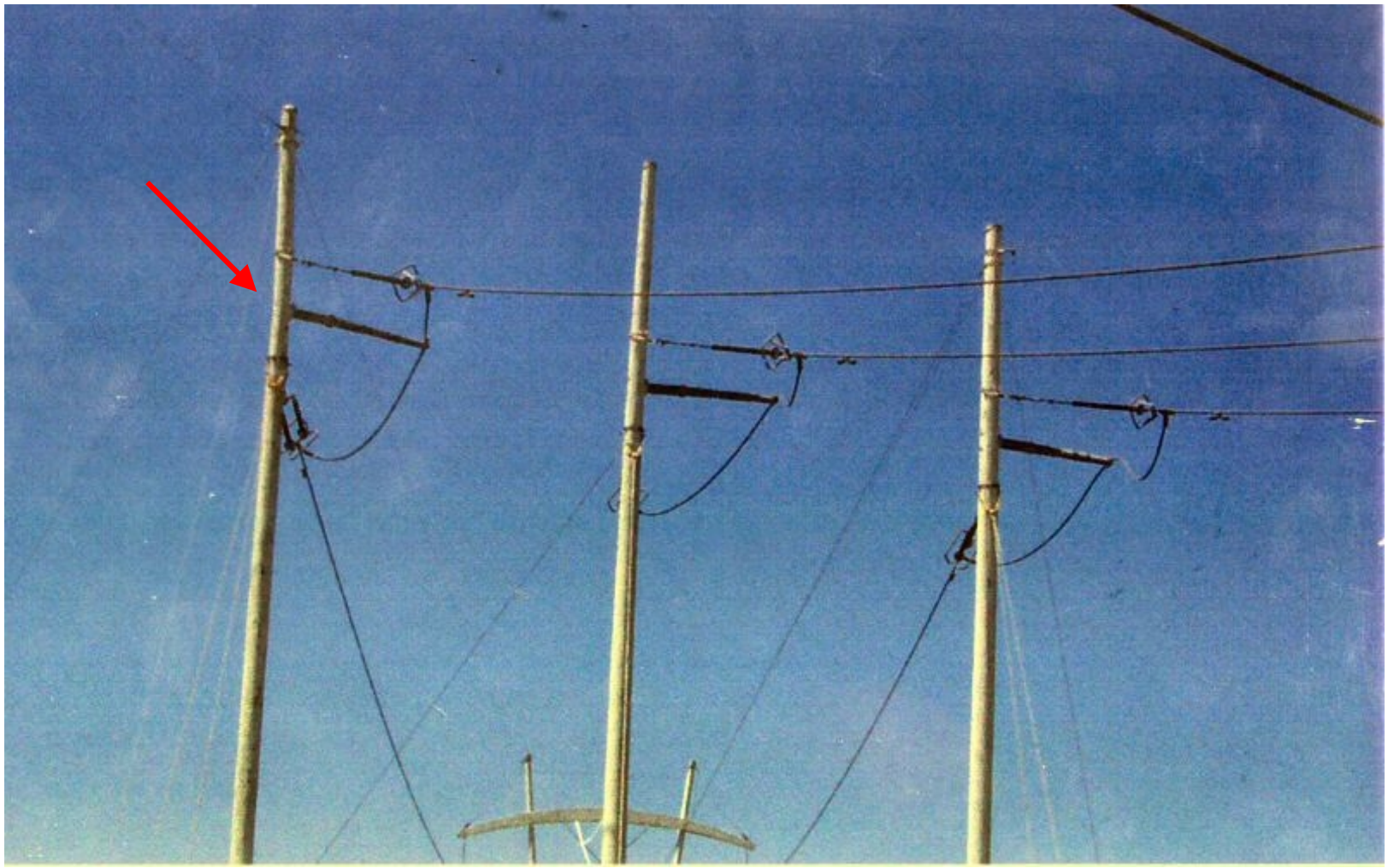


May 6, 2003, store#2511

Accelerator (Cont.)

- First beam study (this week) since 4/26 week
- Power outage next week to fix 345 kV power pole.
  - Two 30 min major power outages including CDF/FC/WH
    - Tuesday (5/27) 7:00 – 7:30 am
    - Friday (5/30) 7:00 - 7:30 am (weather permitting.)
  - No colliding beam operation between Tuesday and Friday
    - CDF is planning to have ~1.5 day supervised access. Two major tasks we are considering during the access are:
      - COT work to diagnose and eliminate discharges in SL8 cells 162 and 163 (in quadrant b) (need to pull plugs)
      - CLC work (replacing remaining 32 tubes in the WEST side)

The Power Pole



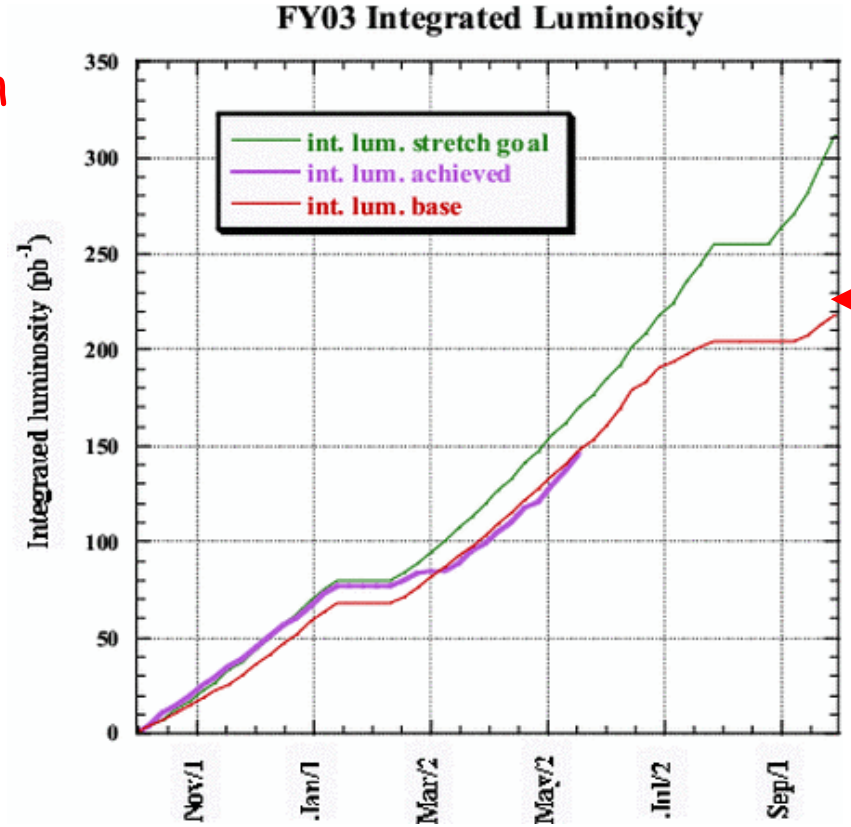
The Same Power Pole (again)

Accelerator (cont.)

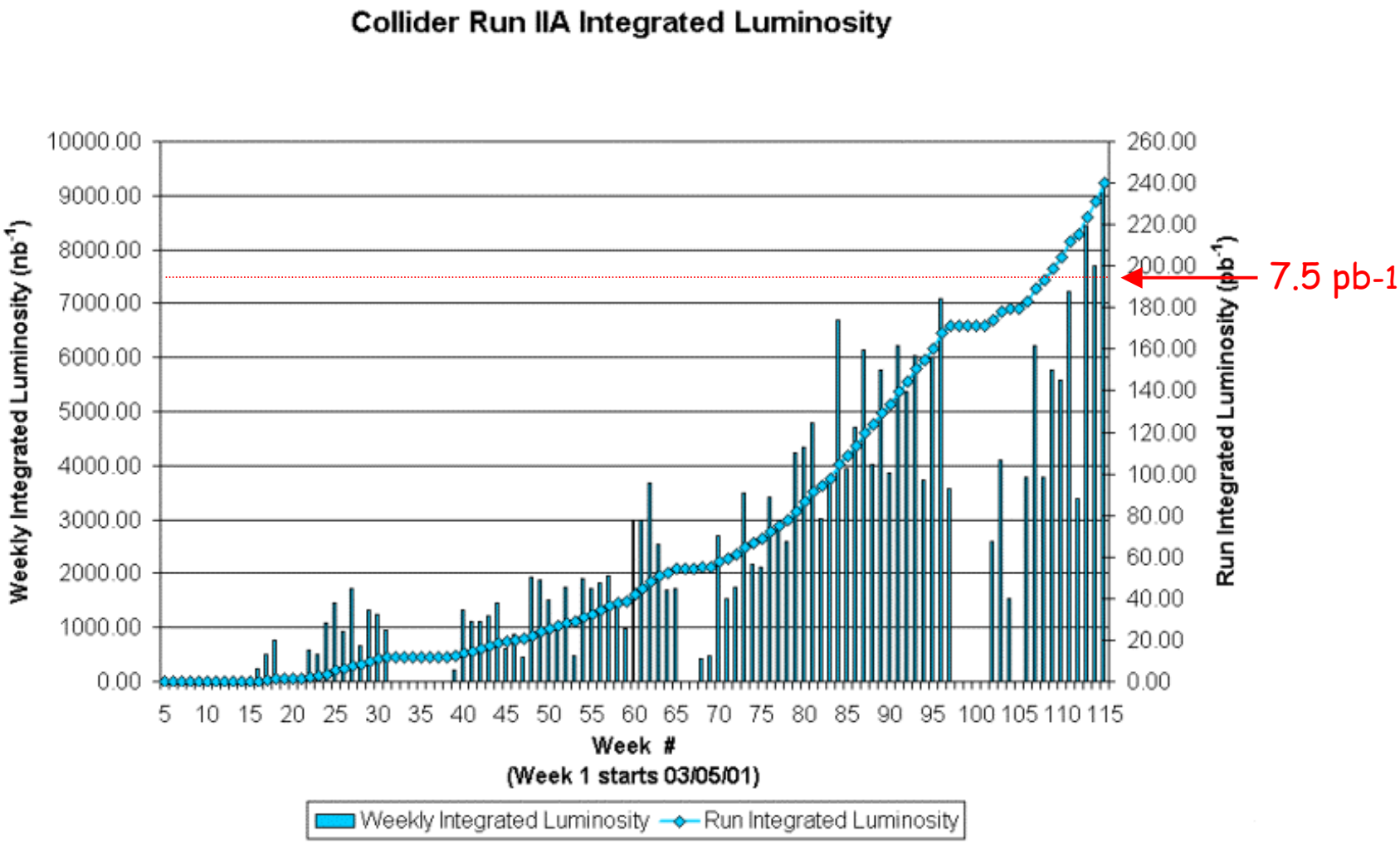
- In order to make 225 pb-1 FY03 goal "AND" to shut down on July 28th (as was scheduled), it requires to deliver 7.5 pb-1/week.

- Since meeting 225pb-1 goal is important for the lab, it is quite likely the starting date of the summer shutdown will delay somewhat:
  - Starts sometime between July/28 – 9/1.
  - Duration of 7-8 weeks

  (driven by e-cooling, NUMI and civil construction time scale.)



Weekly Delivered Lum (again)

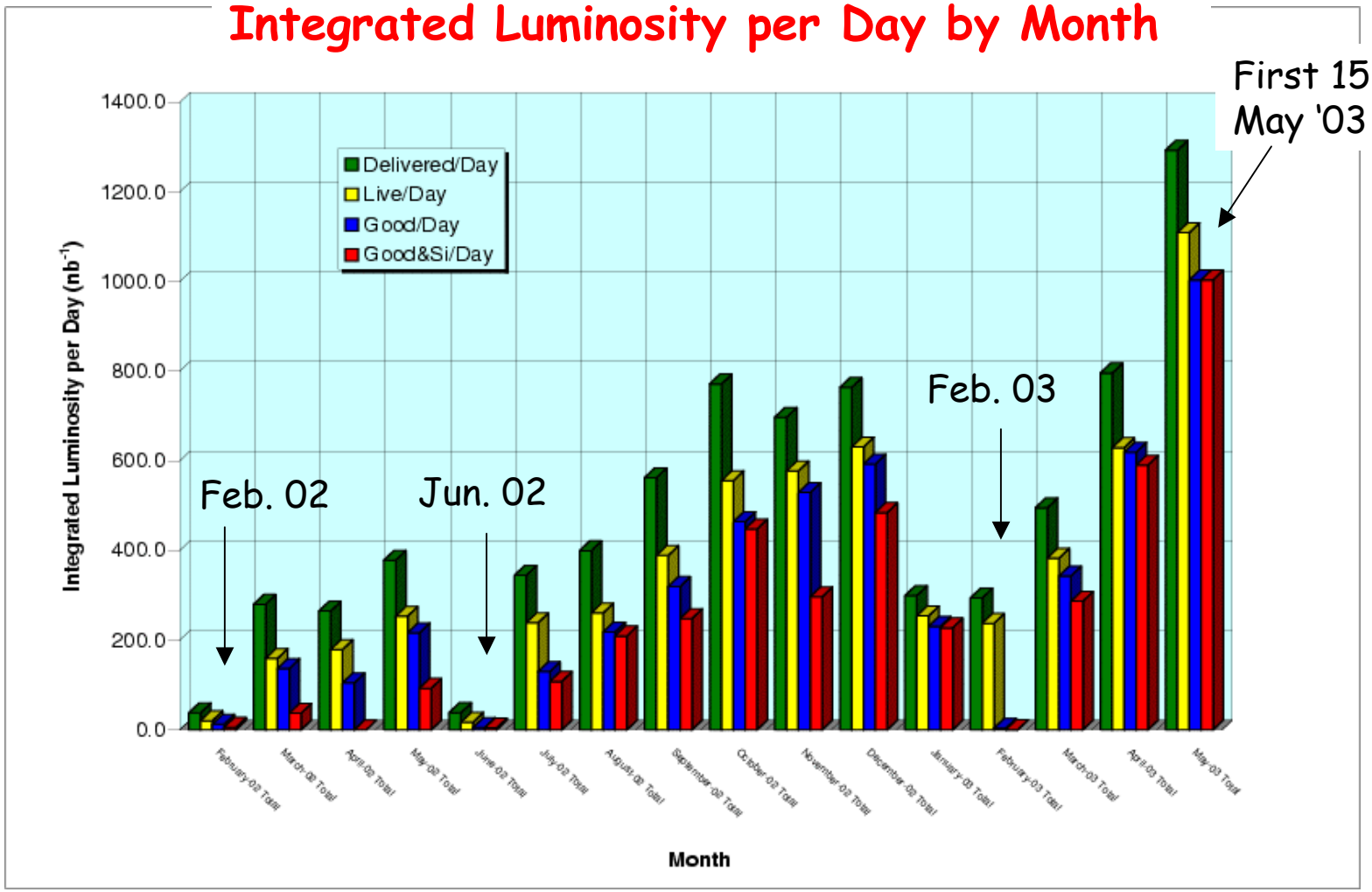


CDF Plan During the Summer Shutdown

CDF does not want the summer shutdown but will make use of this and planning to do followings:

- Complete shielding of low Beta's on E & W sides.
- Replace East CLC phototubes
- COT maintenance/replace wire planes
- EM timing on plug calorimeter
- Variety of infrastructure improvements
  - Solenoid chokes rebuild
  - New fans in all power supplies
  - Clean filters
  - Complete CF4 plumbing
  - Reinstall west miniskirts
  - etc.,

CDF Data Taking



Numerology

	Today (2003)	1 year ago (2002) From 05/30/02 collab. Mtg talk by Arnd Meyer
• L1/L2/L3 rates:	18k/250/75 Hz ~45e30, Physics_1_04 v9	6k/240/30Hz ~15e30, physics_1_01 v8
• Biggest run:	1553 nb-1 (run 163064) taken May 17-18th 17h w. Si.	447 nb-1 (run 145005) taken May 17, 11h w Si.
• Highest Init. Lum.	47.5e30 (May 17th)	20.6e30 (May 19th)
• Best store CDF int. Lum	1553 nb-1 (one run) (store 2555, May 17th)	602 nb-1 (4 runs) (Store 1332, May 17th)
• Best "CDF-week" (most pb-1 to tape)	9.1 (pb-1)/10.3 (pb-1) (week of May 11th)	2.97 (pb-1)/3.47 (pb-1) (week of May 16th)
• Best Store Efficiency	94.2% with Si (1 run) (May 17th, 9.1 of 10.3 pb-1)	93.2% no Si (4 runs) (May 16th, 506 of 543 nb-1)

Downtime and Deadtime

- Downtime – much better when we keep taking data……
  - HV Trips (COT, Silicon, muon, etc..) (not so often these days)
  - L3/EVB/CSL/L2, etc… (comes/goes in wave. Right now, it is good)
  - HRRs (bunch counter errors, TDC done timeout, etc…)
  - Trigger table tests, 2 SRC tests, XFT tests… (future investment)
  - Startup time, waiting to bring up HV at beginning of the store.
  - Silicon D-mode Calibration and other odds and ends
  - Downtime due to operator errors are very small.
- Dead time – much easier when lum is low and trigger rates low, but…
  - L1/L2 busy dead time (much work in progress, eg. 2SRC readout)
  - Hitting CSL output limit -- design 20Mb/sec. This current problem should be solved by:
    - Tightening (wisely) trigger filters, limiting L3 output rates
    - Dropping L3 reconstruction banks and other diagnostic banks
    - Compressing silicon/COT raw data banks, etc..
  - However, at the same time, we are also reviewing/studying the possibility/consequence of extending the current CSL 20Mb/sec limit.

More on Downtime & Deadtime

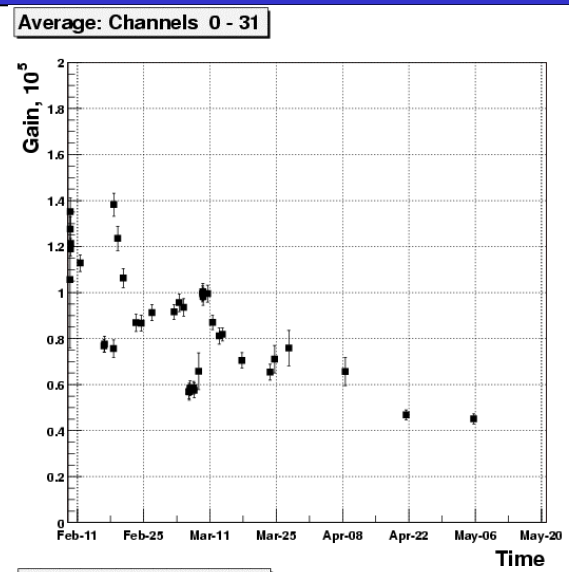
- Typical good store recently -- ~ 1500 nb-1
  - Startup: ~4-5 min (TEVMON green) + 3.2min (Si HV up)
    for Inst Lum 45e30, we loose around 20 – 25 nb-1 (~ 1.5%)
  - L1/L2 readout deadtime (running L1 around 16-18 kHz) (~ 3%)
  - HRR's (much better since Silicon FTM Buffing) (~ 1-2%)

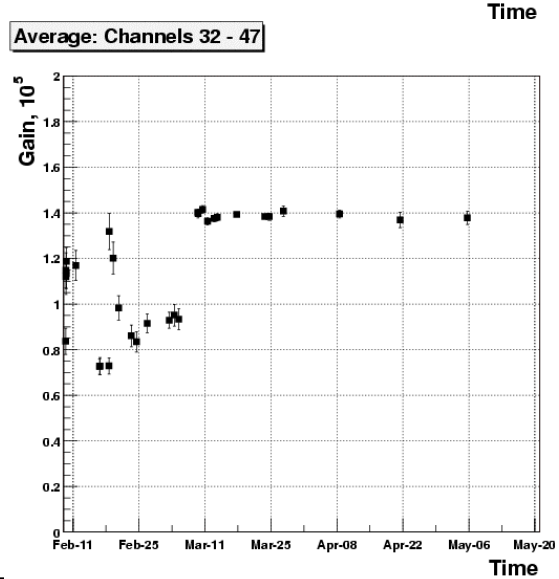
If we have no down time, we can run the entire store with 94 – 95%.
Typically we have some downtime (~5%) during a store, so our
Typical data taking efficiency is around 90%.

We are working on beating down inefficiencies in all area.
Large amount of constant effort by many people are going on….

CLC Status

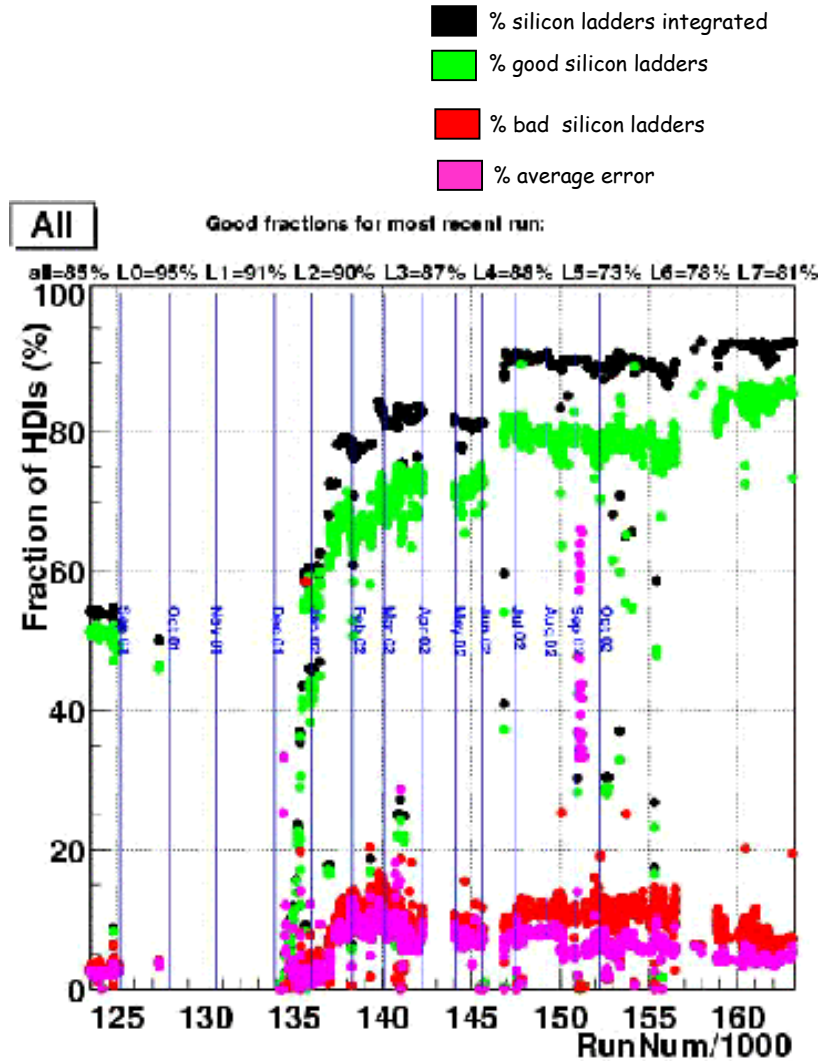
- Replaced 47 PMTs in the West CLC during Jan. 2003 shutdown.
  Tubes were contaminated by helium and gain had dropped by ~80% in 2 weeks. These tubes are still fairly unstable (top plots).
- In March 7th access, 16+2 West PMTs were replaced. The new tubes operate very stable (bottom plot) (gain variations < 1 %)
- Plan to replace remaining West PMT's in the next week access.
- All the East tubes will be replaces in this summer shutdown.





Silicon Status

- We have best coverage and stability ever, that the silicon is integrated very close to 100% of the time.
- The most important recent improvements:
  - The FTM "buffing". Removed the dangerous running condition which generated HRRs.
  - Silicon can be added much faster due to the good losses, speeding up TEVMon wait, HV-up process.
- Near future improvements:
  - 2 SRC config (only SVX has to be read out for the trigger, don't nave to wait for slow L00/ISL readout.



Summary

- CDF and Accelerator are both doing very well, recently. Accelerators made several records in the last few weeks (~10pb-1/week delivered).
- Even with high luminosity store, we generally achieve above 90% data taking efficiency with silicon in almost all the time. However, we need to invest (hit in efficiency) some time for the future improvement.
- Due to power pole replacement, there will be power outage/supervised access next week (Tues ->).
- Summer shutdown will start sometime 7/28-9/1 for 7-8 weeks. 225pb-1 (FY2003) seems likely.